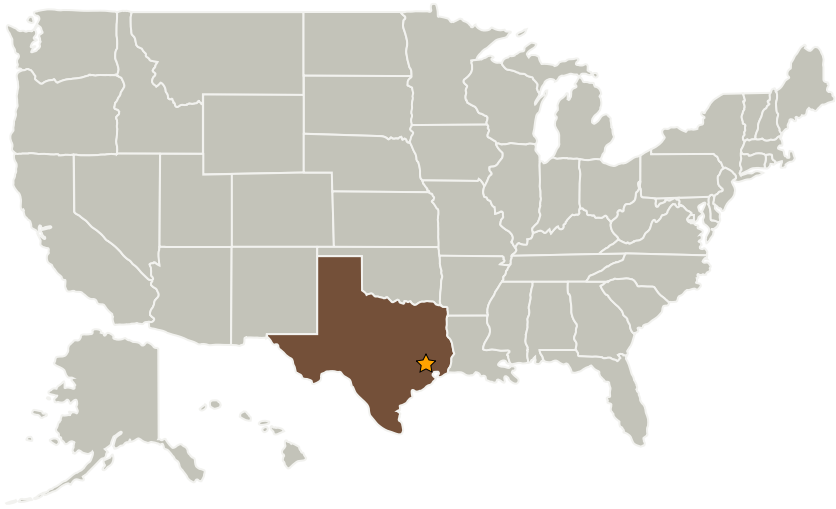
Model-Based Real Time Assessment of Capability Left for Spacecraft Under Failure Mode, Phase I

Completed Technology Project (2006 - 2006)

Project Introduction

The proposed project is aimed at developing a model based diagnostics system for spacecraft that will allow real time assessment of its state, while it is impacted by a failure mode, and provide to the crew the possible reconfiguration strategies to continue the mission. While a lot of research is being done on the development of Integrated Vehicle Health Management (IVHM) system, very little effort is made to provide the spacecraft with the capability to use IVHM information in order to assess the possible strategies possible when a failure event has impacted the vehicle. A model based system can use its understanding of the system state to deduce the potential reconfiguration commands and optimize the outcome in order to preserve the mission goals. Our proposed project is targeted at supporting the spacecraft fault tolerance capability by searching the system states space and selecting the most appropriate sequence of actions to execute in order to optimize the possibility of mission success, by reconfiguring the spacecraft to a desired new state.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Johnson Space Center (JSC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Johnson Space Center(JSC)	Lead Organization	NASA Center	Houston, Texas
Tietronix Software, Inc.	Supporting Organization	Industry Small Disadvantaged Business (SDB)	Houston, Texas

Primary U.S. Work Locations
Texas

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX11 Software, Modeling, Simulation, and Information Processing
  - TX11.5 Mission Architecture, Systems Analysis and Concept Development
    - TX11.5.2 Tools and Methodologies for Performing Systems Analysis